

App. No. 10/808,635  
 Amendment Dated January 22, 2007  
 Reply to Office Action of October 20, 2006

### In the Specification

Please replace the paragraph beginning on page 1, line 20 as follows:

"An example of a modern band-gap reference circuit is illustrated as circuit 500 in FIGURE 5. As shown in the figure, two bipolar transistors (Q1, Q2) are arranged with a common base that is connected to VDD. Two resistors (R1, R2) are series connected between the emitter of the first bipolar transistor (Q1) and the reference output (VREF). Another resistor (R3) is connected between the emitter of the second bipolar transistor (Q2) and the reference output (VREF). An error amplifier (EAMP) is used to adjust the voltage of the reference output (VREF) through feedback. At steady-state, the voltage at the common point of resistors R1 and R2 is the same as the voltage at the emitter of the second bipolar transistor (Q2). The two bipolar transistors (Q1, Q2) are arranged to provide a ten-to-one (10:1) current density difference with respect to one another (Q2 to Q1). The ten-to-one current density results in a 60mV difference between the base-emitter voltages of two bipolar transistors ( $\Delta V_{be} = V_t \cdot \ln(A1/A2) = 26\text{mV} \cdot \ln(10) = 60\text{mV}$ , at room temperature. A1 and A2 are the respective emitter areas of bipolar transistors Q1 and Q2. Current I1 is set to equal current I2 by means of resistors R2, R3, and feedback operation of error amplifier EAMP. The 60mV difference appears across the first resistor (R1). The voltage between VDD and the output of the error amplifier corresponds to a reference voltage (VREF) that is given as  $V_{REF} = V_{be} + X \cdot V_t$ , where X is a constant that is used to scale the temperature correction factor. The temperature correction factor (X) is adjusted by the ratio of the resistors  $((R2/R1) \cdot \ln(A1/A2))$ . Typical temperature corrected reference voltages of 1.25V are achieved by this configuration."

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"An apparatus and method provide for curvature corrected temperature variations in a band-gap reference circuit. The apparatus includes a band-gap cell, an IPTAT circuit, a resistor, and a feedback circuit. The band-gap cell is arranged to provide a band-gap voltage. The resistor circuit is coupled to both the band-gap cell and the IPTAT circuit. The feedback circuit is arranged to selectively activate the IPTAT circuit such that an additional correction factor is added to the temperature response of the band-gap cell to provide a second order curve. The IPTAT circuit can be implemented as a simple transistor that is responsive to changes in absolute temperature."

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